TYPE 1

Reactants present in stoichiometric amounts (same mole ratio as in balanced equation) – “A reacts with sufficient B…”

OR

The limiting reactant has been identified for you

– “A reacts with an excess of B…”

STEPS

1. Balanced chemical equation

2. Given mass of A, calculate moles of A (use molar mass of A).

3. With moles of A, calculate moles of B, using mole ratio from balanced equation.

4. With moles of B, calculate mass of B (use molar mass of B).

TYPE 2

One of the reactants is limiting. Must identify which one. (Hint: masses of at least two reactants will be given.)

STEPS

1. Balanced chemical equation

2. Given mass of each reactant, calculate moles of each reactant (use molar masses of compounds)

3. Use moles of each reactant to calculate moles of any product, using mole ratio from balanced equation. Reactant that produces less of the product is limiting.

4. If you haven’t already calculated it (in step 3), use limiting reactant to calculate moles of required product, using mole ratio from balanced equation.

5. With moles of product, calculate mass of product (use molar mass of product).

This mass

**= THEORETICAL YIELD**

TYPE 3

Percentage Yield

Problem will usually involve calculating a THEORETICAL YIELD (see Type 2).

You will be given an **ACTUAL YIELD** and need to calculate a **PERCENTAGE YIELD**

Percent Yield

= Actual Yield x 100

Theoretical Yield

OR

You will be given a percent yield for the reaction (percent efficiency), and need to calculate the actual amount obtained.

Actual Yield

= Theoretical Yield

x Percent Yield

100

TYPE 3B

Purity of Reactants

You will be given the mass of an impure reactant, e.g., “a sample of ore has a mass of…”.

For reaction A → B :

Work forwards – “The ore is 10.5% A by mass. Calculate total amount of B possible.”

Mass ore x given % A = Mass A

Proceed with usual stoichiometric problem.

Work backwards – “The mass of B obtained was…”

Determine amount of A that reacted to produce B.

% Purity = Mass of A

Mass of original sample

x 100